

Amendment to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (canceled).

2. (currently amended): A volume allocating method in a storage management system for managing operation of a storage device connected via a network by use of a storage management server, the volume allocating method comprising:
receiving, via the network, a condition for allocating a volume, wherein the condition is designated by a client;
obtaining information on operation history of the storage device from a memory device for storing, as history, information including a performance value of a disk group obtained upon actually operating the storage device;
obtaining from the storage device information on specification values including a performance value of the storage device;
determining at least one candidate of an allocable volume by obtaining a performance margin and using the performance margin to determine the at least one candidate of an allocable volume in accordance with the received condition for allocating the volume and based on the information on the operation history of the storage device and the information on specification values of the storage device;

transmitting information on the volume of the at least one candidate to the client;

receiving the information on the volume of the at least one candidate in the client;

receiving from the client a request to allocate a volume selected from the at least one candidate;

allocating the volume to the storage device in accordance with the information on the volume selected from the at least one candidate;

~~A volume allocating method according to Claim 1, further comprising:~~

storing previously, in the memory device, a plurality of policies, one of which is selected by designating the condition for allocating the volume in the client, wherein each of the plurality of policies includes information on at least the performance value and an operating time zone; and

storing previously, in the memory device, information on a forecasted performance value per unit time, a theoretical performance value, and information on the operation history of the volume of the disk group as an allocation target,

wherein the forecasted performance value is an average performance value per unit time based on the operation history of a capacity, ~~and~~

wherein the theoretical performance value is a performance value at which the disk group theoretically exhibits maximum performance, and

wherein the performance value at which the disk group theoretically exhibits maximum performance is obtained by multiplying the number of drives in the disk group by the performance of each drive.

3. (previously presented): A volume allocating method according to Claim 2, wherein the step of determining the at least one candidate further comprises:

obtaining the performance margin by using the theoretical performance value and the forecasted performance value per unit time of the volume included in the disk group;

subtracting the performance value designated by the policy from the obtained performance margin; and

determining, as the at least one candidate, the volume of the disk group when the obtained value is positive as a result of the subtraction.

4. (currently amended): A storage management server for managing the operation of a storage device connected via a network, the storage management server comprising:

a database for operation history which stores, as history, information including a performance value of a disk group obtained upon operating the storage device;

a database for a volume performance value which stores information on specification values including performance, reliability, and a capacity of the storage device obtained from the storage device;

a policy database which stores information on policies including the performance corresponding to a plurality of set policies;

first processing means which calculates a forecasted performance value from the information on the performance value of the disk group stored in the database for operation history,

wherein the forecasted performance value is an average performance value per unit time based on the operation history;

second processing means which obtains a performance margin by using a theoretical performance value of the volume and the forecasted performance value obtained by the first processing means,

wherein the theoretical performance value is a performance value at which the disk group theoretically exhibits maximum performance, and

wherein the performance value at which the disk group theoretically exhibits maximum performance is obtained by multiplying the number of drives in the disk group by the performance of each drive; and

volume determination processing means which determines at least one allocation candidate for allocating the volume in accordance with a calculation result of the second processing means.

5. (previously presented): A storage management server according to Claim 4,

wherein the first processing means calculates the forecasted performance value per unit time based on information on the performance value obtained from the database for operation history, and

wherein the database for a volume performance value stores information on the forecasted performance value per unit time obtained by the first processing means, corresponding to the disk group.

6. (previously presented): A storage management server according to Claim 4,

wherein the second processing means performs processing for obtaining a difference between the performance margin per unit time and a designated performance value stored in the policy database, and

wherein the volume determination processing means determines, as the at least one allocation candidate, the volume which is obtained by the second processing means when the difference which is obtained is positive.

7. (previously presented): A storage management server according to Claim 4, further comprising:

means for transmitting information indicating a volume candidate determined by the volume determination processing means so as to display the information on a client connected to the storage management server; and

means for receiving the information on the volume allocation selected by the client in accordance with the displayed information.

8. (previously presented): A system having a storage management server according to Claim 4,

wherein the storage management server has a client connected thereto via the network, and

wherein the client comprises:

means for designating and inputting a condition for allocating the volume;

means for displaying information indicating the at least one allocation candidate determined by the volume determination processing means; and

means for transmitting to the storage management server, the information on the volume allocation selected from the volume information of the at least one allocation candidate displayed on the means for displaying.

9. (currently amended): A program for selecting and generating at least one volume candidate functioning on a storage management server, the storage management server comprising a database on operation history for storing, as history, information including a performance value of a disk group obtained by operating a storage device connected via a network, a database for a volume performance value for storing information on specification values including performance, reliability, and a capacity of the storage device, obtained from the storage device, and a policy database for storing information on a policy including the performance corresponding to a plurality of set policies, the program for generating the at least one volume candidate comprising:

a first processing step of calculating a forecasted performance value from the information on the performance value of the disk group stored in the database on the operation history,

wherein the forecasted performance value is an average performance value per unit time based on the operation history;

a second processing step of obtaining a performance margin based on a theoretical performance value of the volume and the forecasted performance value obtained in the first processing step,

wherein the theoretical performance value is a performance value at which the disk group theoretically exhibits maximum performance, and
wherein the performance value at which the disk group theoretically exhibits maximum performance is obtained by multiplying the number of drives in the disk group by the performance of each drive;

a volume determination processing step of determining the at least one volume candidate for allocating the volume in accordance with a calculation result of the second processing step; and

a step of generating information for displaying the least one volume candidate from information based on the volume determination processing step, so as to display the at least one volume candidate on a client connected to the storage management server.

10. (currently amended): A volume allocating method in a storage management system for managing operation of a storage device connected via a network by use of a storage management server, the volume allocating method comprising:

receiving, via the network, a condition for allocating a volume, wherein the condition is designated by a client;

obtaining information on operation history of the storage device from a memory device for storing, as history, information including a performance value of a disk group obtained upon actually operating the storage device;

obtaining from the storage device information on specification values including a performance value of the storage device;

determining at least one candidate of an allocable volume by obtaining a performance margin and using the performance margin to determine the at least one candidate of an allocable volume in accordance with the received condition for allocating the volume and based on the information on the operation history of the storage device and the information on specification values of the storage device;

transmitting information on the volume of the at least one candidate to the client;

receiving the information on the volume of the at least one candidate in the client;

receiving from the client a request to allocate a volume selected from the at least one candidate;

allocating the volume to the storage device in accordance with the information on the volume selected from the at least one candidate;

~~A volume allocating method according to Claim 1, further comprising:~~

previously storing, in a memory device of the storage management server, a plurality of policies including information on at least the performance value and the operating time zone;

previously storing, in the memory device of the storage management server, information on a forecasted performance value per unit time, theoretical performance value, and volume of the disk group as the allocation target,

wherein the forecasted performance value is an average performance value per unit time calculated using information on the operation history of a capacity, and

wherein the theoretical performance value is a performance value at which the disk group theoretically exhibits maximum performance, and

wherein the performance value at which the disk group theoretically exhibits maximum performance is obtained by multiplying the number of drives in the disk group by the performance of each drive;

displaying, on a display screen of the client, information on the plurality of policies transmitted from the storage management server;

selecting one policy by use of input means of the client, from the plurality of policies displayed on the display screen;

displaying, on the display screen, volume information of the received allocated at least one candidate;

selecting and designating one of the allocated at least one candidate displayed on the display screen; and

transmitting, to the storage management server, information on the designated allocated at least one candidate.

11. (currently amended): A storage management server for managing operation of a storage device connected via a network, comprising:

a database for operation history which stores, as history, information including a performance value of a disk group obtained upon operating the storage device;

a database for a volume performance value which stores information on specification values including a performance value of the storage device;

processing means which calculates a forecasted performance value from the information on the performance value of the disk group stored in the database for operation history and which obtains a performance margin per unit time using the

obtained forecasted performance value and a theoretical performance value stored in the database for a volume performance value,

wherein the forecasted performance value is an average performance value per unit time based on the operation history, and

wherein the theoretical performance is a performance value at which the disk group theoretically exhibits maximum performance, and

wherein the performance value at which the disk group theoretically exhibits maximum performance is obtained by multiplying the number of drives in the disk group by the performance of each drive;

volume determination processing means which determines at least one candidate for allocating a volume in accordance with a calculation result of the processing means; and

means for transmitting, to a client connected to the storage management server, information indicating the at least one candidate determined by the volume determination processing means.

12. (original): A storage management server according to Claim 11, further comprising:

a policy database which stores information on a policy including the performance corresponding to a plurality of set policies.

13. (previously presented): A storage management server according to Claim 11, wherein the database for a volume performance value stores a disk group

name, reliability, a capacity, the theoretical performance value, and the forecasted performance value corresponding to the disk group.

14. (previously presented): A storage management server according to Claim 11, wherein the database for operation history stores a disk group name and an actual estimated performance value corresponding to the disk group.

15. (previously presented): A storage management server according to Claim 12, wherein the processing means comprises:

first processing means which obtains the unit time from the designated policy and which segments the history information stored in the database on the operation history per unit time;

second processing means which obtains an average of the segmented data and which obtain the forecasted performance value;

third processing means which obtains the performance margin by subtracting the forecasted performance value from the theoretical performance value per unit time and which subtract the performance value designated by the policy from the performance margin per short time; and

fourth processing means which determines whether or not the subtracted value is positive and which determine the volume of the target disk group if the subtracted value is positive.

16. (previously presented): A storage management server according to Claim 11, wherein the client comprises:

means for receiving information for allocating the volume selected from the received at least one candidate by the client; and

means for transmitting, to the storage device, the information for allocating the volume received by the receiving means so as to allocate the volume of the storage device.

17. (previously presented): A system according to Claim 8, wherein the display means of the client displays the information indicating a name, performance, and reliability of the disk group as the at least one allocation candidate.

18. (canceled).

19. (currently amended): A volume allocating method in a storage management system, comprising:

receiving a condition on requested performance per operating time zone of a volume designated by a client;

referring to history information obtained from a result of actually operating disk groups;

calculating a performance margin of each disk group upon allocating the volumes of the disk groups by subtracting a forecasted performance value from a theoretical performance value,

wherein the forecasted performance value is an average performance value per unit time based on the operation history, and

wherein the theoretical performance value is a performance value at which the disk group theoretically exhibits maximum performance, and

wherein the performance value at which the disk group theoretically exhibits maximum performance is obtained by multiplying the number of drives in the disk group by the performance of each drive;

obtaining at least one volume candidate as an allocation target from the disk groups in accordance with a result of calculating the performance margin and presenting the at least one volume candidate to the client; and

receiving and storing one volume candidate selected by the client.

20. (currently amended): A volume allocating method in a storage management system according to Claim 19, further comprising the step of:

displaying the at least one volume candidate as the allocation target on a display screen of the client and selecting one volume candidate of the displayed at least one volume candidate.

21. (new): A volume allocating method according to Claim 2, further comprising:

displaying information including at least the performance value and reliability corresponding to the policy, an index for selecting a memory capacity, and an index for selecting the policy on the display screen of the client so as to designate the condition for allocating the volume by the client.

22. (new): A volume allocating method according to Claim 10, further comprising:

displaying information including at least the performance value and reliability corresponding to the policy, an index for selecting a memory capacity, and an index for selecting the policy on the display screen of the client so as to designate the condition for allocating the volume by the client.